NATURAL RESOURCES CONSERVATION SERVICE
PACIFIC BASIN AREA
CONSERVATION PRACTICE STANDARD

RIPARIAN FOREST BUFFER

(Hectare, Acre)
CODE 391

DEFINITION

An area of trees and/or shrubs located adjacent to and up-gradient from water bodies.

PURPOSES

- Reduce excess amounts of sediment, organic material, nutrients, pesticides and other pollutants in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow;
- Create riparian habitat and corridors for wildlife;
- Create shade to lower water temperatures to improve habitat for fish and other aquatic organisms; and,
- Provide a source of detritus and large woody debris for fish and other aquatic organisms.

CONDITIONS WHERE PRACTICE APPLIES

On areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands, coastal shores and areas with ground water recharge.

The riparian forest buffer is a component of a planned resource management system including nutrient, pesticide, runoff, sediment and erosion control practices.

CRITERIA

General Criteria Applicable to All Purposes Named Above.

The riparian forest buffer will consist of one to three zones of vegetation adjacent to water bodies. The location, width, layout and density of the riparian forest buffer will accomplish the intended purposes and function, and compliment natural features. The riparian forest buffer may be designed to impede concentrated flow, filter surface runoff and encourage water infiltration.

Zone 1 of the Riparian Forest Buffer is an area of permanent forest vegetation immediately adjacent to the stream channel. Zone 1 will consist of a minimum width of 5 meters (15 feet), the distance measured horizontally on a line perpendicular to the water body that begins at the normal water line, or at the upper edge of the active channel or shore.

Zone 2 of the Riparian Forest Buffer is an area of non-permanent forest vegetation designed for long term rotation and / or harvesting of forest products, as well as establishment of wildlife habitat. Zone 2 will begin at the edge and up-gradient of zone 1 and extend a minimum distance of 6 meters (20 feet) measured horizontally on a line perpendicular to the water course or water body. The minimum combined width of zones 1 and 2 equal 30 percent of the geomorphic flood plain or not less than 11 meters (35 feet).

Zone 3 of the Riparian Forest Buffer is an area of a vegetative strip of grasses and forbs for the reduction of surface runoff and the deposition of excess sediment. Zone 3 is adjacent to and up gradient of zone 2 and. The width of zone 3 is dependent on the slope of the land and the upslope land use. Follow the recommendations of the conservation practice standard for the Pacific Basin standard, Filter Strip (393A).

Dominant vegetation for zone 1 and 2 will consist of existing or planted trees and shrubs suited to the site, and intended purposes. Species selection will favor tree and shrub species that are native and have multiple values, such as those suited for timber, biomass, nuts, fruit, nesting,

aesthetics and tolerance to locally. Where establishment of native species is not feasible, select species observed in areas with similar site characteristics. Site characteristics to consider are soil types, rainfall, elevation and land forms.

Consider including a diverse set of species in the planting area. Plantings will consist of two or more species with individual plants suited to the seasonal variation of soil moisture status of individual planting sites. Plant types and species shall be selected based on their compatibility in growth rates and shade tolerance. Favor species which complement existing or planned agricultural activities adjacent to the riparian buffer. Consider the effects of shading on adjacent fields, and the tolerance of selected species to herbicides used. Avoid introducing species that readily spread, or are considered weedy, also avoid species which may attract undesirable pests.

Species selection should be based on plant suitability and adaptability for the site and intended purpose. Also, refer to applicable tree establishment practice standards in the Field Office Technical Guide section IV for guidance on tree spacing and establishment guidance.

Additional Criteria to Reduce Excess Amounts of Sediment, Organic Material, Nutrients, Pesticides and Other Pollutants in Surface Runoff and Reduce ExcessNutrients and Other Chemicals in Shallow Ground Water Flow.

When the primary purposes of the riparian forest buffer includes reduction of sedimentation and water quality concerns zones 1, 2 and 3 will be promoted. Zone 2 will begin at the edge and up-gradient of zone 1 and extend a minimum distance of 6 meters (20 feet). Zones 1 and 2 shall total a minimum of 11 meters (35 feet).

For slowing and spreading concentrated flow into sheet flow and increase deposition of sediment and sediment associated pollutants a third zone, Zone 3, will begin up gradient of zone 2 and will be made up primarily of grasses.

Additional Criteria to Create Riparian Habitat and Corridors for Wildlife.

Criteria for creation of wildlife habitat and riparian corridors will focus on zones 1 and 2, and the selection of species which promote the wildlife of the area. Trees and shrubs selected for this purpose must provide food, nesting sites and/or shelter for various wildlife species being promoted including birds, deer, pigs, carabao, etc.

Additional Criteria to Create Shade to lower Water Temperatures to Improve Habitat for Fish and Other Aquatic Organisms.

A buffer for lowering water temperatures shall consist of at least zone 1 for water bodies less than or equal to 10 meters in width. The buffer canopy should provide shade for at least 50 percent of the water course or have a mature canopy of up to 10 meters, whichever is less.

Additional Criteria to Provide a Source of Detritus and Large Woody Debris for Fish and Other Aquatic Organisms.

Within zone 1 as a minimum, establish, favor or manage vegetation capable of producing stems and limbs of sufficient size to provide an eventual source of large woody debris for in-stream habitat for fish and other aquatic organisms.

CONSIDERATIONS

The primary function of Riparian Forest Buffer System is to provide control of the stream environment. This includes modifying stream temperature and controlling light quality and quantity; enhancing habitat diversity; modifying channel morphology; and enhancing food web and species richness. All of these factors are important to the ecological health of a stream and are best provided by a Riparian Forest Buffer which includes a zone 1 that approximates the original native vegetation. Management of a zone 2 for long term rotation and forest product utilization may promote sustainability of stream environment functions. Riparian Forest Buffers contribute to bank stability and minimize sedimentation loading from in-stream bank erosion.

Another function of the Riparian Forest Buffer is control of sediment and sediment-born pollutants carried in surface runoff. Properly managed Riparian Forest Buffers should provide a high level of control of sediment and sediment borne chemicals. The conversion of concentrated flow to sheet flow for the deposition of coarse sediment are the primary functions of zone 3 - the grass vegetated filter strip.

Where ephemeral, concentrated flow or sheet and rill erosion and sedimentation is a concern in the area up-gradient of zone 2, consider the establishment of a vegetated strip in zone 3 consisting of grasses and forbs. The conservation practices of Pacific Basin standard, Filter Strip (393A) may be utilized for this purpose. When concentrated flow erosion and sedimentation cannot be controlled vegetatively, consider structural or chemical treatments.

The severity of bank erosion and its influence on existing or potential riparian trees and shrubs should be assessed. Watershed-level treatment or streambank stability activities may be needed before establishing a riparian forest buffer. Streambanks and shorelines may be stabilized by designs using the Pacific Basin Standard Streambank and Shoreline Protection (580).

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Requirements for operation and maintenance of the practice shall be incorporated into site specifications.

Specifications include layout, planned species, spacing, planting techniques, soil testing and irrigation recommendations. For species selection and specific planting specifications refer to the appropriate Pacific Basin Ecological Sciences technical guides and references.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

The riparian forest buffer will be inspected periodically, protected and restored as needed, to maintain the intended purpose from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, pesticide use on adjacent lands, livestock and feral animal damage, and fire.

Replacement of dead trees or shrubs and control of undesirable vegetative competition will be continued until the buffer is, or will progress to, a fully functional condition.

As applicable, control of concentrated flow erosion or mass soil movement shall be continued in the up-gradient area immediately adjacent to zone 2 to maintain buffer function.

Any removal of tree and shrub products shall be conducted in a manner that maintains the intended purpose.

For the purpose of reducing excess pollutants in surface runoff and shallow groundwater (zone 1, 2, and 3), or providing habitat and corridors for wildlife (zone 1 and 2), manage the dominant canopy to maintain maximum vigor of overstory and understory species.

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure buffer function shall not compromise the intended purpose. Biological control of undesirable plant species and pests shall be implemented where available and feasible.

Additional operation and maintenance requirements shall be developed on a site specific basis to assure performance of the practice as intended.